

REMARKS

Applicant respectfully requests reconsideration of this application as amended. Claims 14-39 have been cancelled without prejudice. No claims have been amended or added. Therefore, claims 1-13 are presented for examination.

Specification

The disclosure is objected to because of the following informalities:

The first sentence of the first page of the specification should be amended to include to patent number of the parent application.

35 U.S.C. § 112 Rejection

Claims 26-31 stand rejected under 35 U.S.C. §112, second paragraph.

35 U.S.C. § 103 Rejection

Claim 1 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Applicant's admitted prior art in view of Yagi et al., U.S. Patent No. 6,109,507 ("Yagi").

Claim 1, recites:

1. (Original) A method, comprising:
applying a flux to a first surface of a substrate, the first surface of the substrate having attached thereto solder bumps, the solder bumps having a melting temperature, and the flux substantially comprising ingredients that have a volatilization temperature less than the melting temperature;
generally aligning the solder bumps with corresponding metal bumps, the metal bumps being attached to a first surface of a chip;
bringing the solder bumps into contact with the corresponding metal bumps; and

heating the solder bumps to a first temperature, the first temperature being equal to or greater than the melting temperature.
(emphasis provided)

The Examiner asserts that the “admitted prior art discloses using a *flux which does not have a volatilization temperature less than the melting temperature*” (Office Action, pages 4 and 6; emphasis provided). However, this is not what claim 1 recites. Claim 1 recites “the solder bumps having a melting temperature, and the flux substantially comprising ingredients that have a volatilization temperature less than the melting temperature” (emphasis provided). The admitted prior art discloses “because the flux is required in the C4 process to hold the chip and substrate together before re-flow, *only those fluxes that have volatilization temperature at or above the solder melting point are suitable for use with the C4 process*” (Specification, page 4; emphasis provided).

Yagi discloses “forming solder bumps on pads provided on a board, wherein a plurality of solder bump layer forming cycles are repeatedly implemented” (Abstract). Yagi further discloses “*the melting point of the solder particle is higher than the evaporation point of the flux*. Thus . . . the solder particles will melt and join with the pad. Then, there will be no air existing at the surface of the pad. Therefore, by implement a heating step according to the present embodiment, the void is prevented from being produced in the performed solder bump.” (col. 3, lines 23-31; emphasis provided). The admitted prior art and Yagi neither individually nor when combined teach or reasonably suggest having a volatilization temperature less than the melting temperature as recited by claim 1. Accordingly, Applicants respectfully request the withdrawal of the rejection of claim 1 and its dependent claims.

Claims 2, 5 and 26-31 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Applicant's admitted prior art in view of Yagi as applied to claim 1 above, and further in view of Hur et al, U.S. Patent No. 6,013,572 ("Hur").

Claims 3, 4 and 7-13 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Applicant's admitted prior art in view of Yagi as applied to claim 1 above, and further in view of Kimura et al, U.S. Patent No. 6,400,034 ("Kimura").

Claim 6 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Applicant's admitted prior art in view of Yagi as applied to claim 1 above, and further in view of Arbib, European Patent No. EP 007622 ("Arbib").

Claim 26-31 have been cancelled without prejudice.

Claims 2-13 depend from claim 1 and thus include all its limitations.

Accordingly, Applicants respectfully request the withdrawal of the rejection of claims 2-13.

Conclusion

In light of the foregoing, reconsideration and allowance of the claims is hereby earnestly requested.

Invitation for a Telephone Interview

The Examiner is requested to call the undersigned at (303) 740-1980 if there remains any issue with allowance of the case.

Request for an Extension of Time

Applicant respectfully petitions for an extension of time to respond to the outstanding Office Action pursuant to 37 C.F.R. § 1.136(a) should one be necessary. Please charge our Deposit Account No. 02-2666 to cover the necessary fee under 37 C.F.R. § 1.17(a) for such an extension.


Charge our Deposit Account

Please charge any shortage to our Deposit Account No. 02-2666.

Respectfully submitted,

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